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AUTHOR Chambers, George A.
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ABSTRACT

American schools will be at risk until they allow all students to achieve near their potential. Until then America is also at risk because the potential of minorities and of the underclass are not being fully developed, and because the nation's goals of social justice and economic growth are not being met. In a study that compared the scores of Hispanic and Caucasian students on the American College Testing Program (ACT) Assessment, the findings included the following: (1) males outscored females for both ethnic groups in all areas except English; (2) Caucasian students scored substantially higher on each subtest and on composite scores; (3) as family income rises so do composite test scores; (4) students attending smaller high schools scored lower than those in larger ones; (5) Hispanic students in Catholic schools scored higher than Hispanics in public schools; and (6) students who had taken advanced courses in science and mathematics scored higher than students in the basic programs. When comparisons were made between groups and in clusters of factors, family income was found to have a strong influence on test scores. The recommendations include the following: (1) increased federal funding for education is needed; (2) school districts must develop new policies; (3) universities and colleges must play a more significant role in public education; (4) school personnel must direct more attention toward minorities and the middle class; and (5) parent and community involvement must increase. (Twelve groups and 17 data tables are appended.) (VM)

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ALL OF AMERICA'S CHILDREN: Variants in ACT Test Scores--What Principals Need to Know

NASSP Annual Convention
Anaheim, California
March 7, 1988

George A. Chambers, Professor
Division of Educational Administration
The University of Iowa
Iowa City, IA 52242
319-335-5306

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INTRODUCTION

American schools will have achieved success when all students, majority and minority, achieve near their potential. That will require efforts yet untried and exerted in America. We are truly a nation at risk, but a risk not highlighted in the famous 1983 report. We are at risk for failing to more fully develop and enhance the talents of our minorities and our underclass whose potential is equal to the majority and middle class, but whose achievement is unequal today. We are making progress, but many of us believe the pace is dangerously slow.

David Martin, former editor of the American School Board Journal, wrote in the 1988 February issue of the Journal, "Wake up; the American dream is fading, and our future is at risk." Martin discusses the expansion of America's underclass, the contraction of the middle class and the dwindling support for public education. He notes with alarm that the American dream, breaking a family's cycle of poverty and bringing immigrants' children into the mainstream, is not working now.

William Johnston of the Hudson Institute and author of Workforce 2000, foresees the U.S. lagging behind in gross national product, 2.9%, compared to world-wide growth of 3.1%. He observes that our failure to educate the poor, minority, and immigrant workers will lead to shortfalls in America's ability to advance economically.

Arthur Wise, a researcher for the Rand Corporation, suggests that the middle class could virtually disappear from the public schools in the decades ahead.

> Those who can afford it will abandon the public school system--it's already happening in large cities. I foresee a two-class educational system, and when that happens--when we lose the middle class--we will have lost the major sustaining force for improving education.

Wise, like Martin, Johnston, and others, foresees the possible creation of a permanent class of undereducated, underemployed people who will be a drain on the economic productivity of the United States and further limit our ability and willingness to financially support public education and the elderly.

Yes, we are a nation at risk. I, too, say wake up America! Wake up and realize that our future is as dependent upon a successful educational system for all children as it is upon a military defense system.

What I propose today is the creation of a defense system for education, one that defends and protects against poverty, unproductive workers, and economic stagnation which can lead to social and political unrest. To steer the present course will render us temporarily safe and in the near future, pitifully sorry. Safe but sorry should not be our fate. We cannot afford to write off any of America's children. Each child will spend 50, 60, even 80 years advancing or curtailing our economic, political, and social systems.

The web that is now being spun for our public schools must be reversed to protect the educational achievement of our children and this nation's economic, political and social future. Our findings regarding factors associated with student test scores, when added to demographic data and projections of Martin, Johnston, and Wise, indicate that student achievement is certain to decline in the decade ahead unless action is taken soon. As America sleeps, the spider spins its web of entrapment for public education. Promises, platitudes, and lip service will not produce needed educational results, but money, hard work, and high expectations will.

This presentation attempts to note problems and potentials of minority achievement in particular, and underclass achievement in general. It attempts to describe where we are now and suggests how Congress, state legislatures, state education departments, universities, school districts, individual schools, principals, teachers, counselors, students, and parents can work together for improvement, much needed improvement of minority and underclass student achievement.

Unless America provides effective education for all, we will fail to achieve our nation's goals of social justice and economic growth. Clearly, achievement of minority students from the underclass can be and must be improved for a better America.

School principals, teachers, and staff are charged with educating all of America's children. How well they do depends on whom you ask. Answers range from the "best system in the world" to "poorest among the major countries in the world." The valid answer, of course, depends on the criteria for judging "how well." Today, you are asked to review your thoughts about our success, our shortcomings, and our opportunities for improvement. For that review, you will temporarily drop your title and role as principal and assume the position with the highest public educational visibility in this nation--that of Secretary of Education. Don't worry. When you are done, you can return to your former position.

Your first mission as Secretary of Education is to assess the educational achievement of America's children, indeed a formidable task. You start by reviewing college entrance assessment scores of 1987 high school graduates. As you know, test scores are the first method used by the federal and state governments, the public, parents,

school boards, and many principals to evaluate the educational achievement of America's youth.

ACT Assessment

The test you select for your review is the ACT Assessment. From a quick review, you learn that the American College Testing Program is located in Iowa City, Iowa. It is a not for profit corporation and has no formal ties with the University of Iowa.

Thirty states are considered as heavy users of the ACT Assessment. A heavy user state is one where the ACT Assessment is used by the majority of student examinees, or a state where at least 30,000 students take the test. The ACT Assessment is a comprehensive evaluation, guidance, and placement service for students and educators involved in the transition from high school to college. It consists of four academic tests, self-reported high school grades, the student profile section (SPS), and the ACT Interest Inventory. Approximately 800,000 students take the ACT Assessment each year.

The four academic tests of the ACT Assessment measure abilities in the subject areas traditionally identified with college and high school programs: English, mathematics, social studies, and natural sciences. The English Usage test measures students' understanding and use of the basic elements of correct and effective writing. The Mathematics Usage test measures their mathematical reasoning and problem-solving ability. The Social Studies Reading test measures the problem-solving skills required in the social studies, and the Natural Sciences Reading test measures the critical reasoning and problem-solving skills required in the natural sciences. ACT test scores are reported on a standard scale that ranges from 1 to 36. The arithmetic average of the

scores on these four tests is the ACT composite score, which is often used as a measure of overall educational development.

Another component of the ACT Assessment is the Student Profile Section (SPS). Students complete the SPS when they register for the test. They provide information about their backgrounds, extracurricular accomplishments, special academic needs, housing plans, financial needs, planned major, and career plans.

In summary, approximately 800,000 students take the ACT annually; 30 states are heavy users; the four areas tested are mathematics, science, English, and social studies. Four individual subscores and a composite score are provided.

You are ready to start work on test results when you recall Murphy's Law that "things are more complicated than they are." Perhaps that law applies to the Secretary of Education just as it does to the principalship. You are soon to learn that it applies to college entrance tests scores as well!

You commence your review with summary test score data and you note with alarm the wide variation in student scores across the nation and among regions and states. You ask yourself whether the magnitude of these variations need exist. Such large differences were frowned upon in your previous assignment as a high school principal, and you remember working diligently to enhance test scores and maximize educational outcomes for all students. You also recall from your experience and reading that there are positive and negative factors associated with student test scores. You ask your staff to review recent research findings and report back to you on test scores and:

- size of school
- type of high school

- course work taken
- gender
- family income
- ethnicity/race

It's nice to have a large staff and one that can provide quick responses. After making the assignment to staff, you leave the office to attend a social function for cabinet members. The next morning you find on your desk the following summary on factors associated with test scores.

Perplexing Information

You lean back in your chair reflecting upon what you have just read.

- The larger the school, the higher the test scores.
- The more coursework, the higher the test scores.
- The higher the family income, the higher the test scores.
- The higher the GPA, the higher the test scores.
- Females score higher in English; males score higher in mathematics, natural sciences, and social studies.
- Whites score higher than Hispanics; Hispanics score higher than Blacks.

Think! That last statement may well ignore the earlier statements. What would the result be if Caucasian and Hispanic and Black students were compared when those students are similarly situated? That is, same school attended, same gender, same family income, same coursework--mathematics and natural sciences, same number of siblings? Maybe, just maybe, much of the differences can be explained or accounted for by how a student is situated.

You are planning a trip to the Southwest next month to visit schools on behalf of the Department. You inquire if any recent research has been conducted where students are similarly situated. Your staff locates an advance copy of a presentation on this very topic to be made at the NASSP Convention in Anaheim in February 1988. You hurriedly read through the report and are astounded by the findings as they have implications for America and all of America's children. You must brief the President on the findings. You jot on your memo pad, **"Student outcomes on test scores are more dependent upon how the student is situated than upon the student's race or ethnicity!"** You now return to the study report and note the following:

Purpose of Study

The purpose of the study was to compare ACT test scores of 1987 Hispanic and Caucasian high school examinees who were similarly situated with regard to same high school attended, same family income range, same mathematics courses taken (algebra I, algebra II, geometry, trigonometry, calculus), same science courses taken (general science, biology, chemistry, physics), gender, and number of siblings. While it is not possible to have students completely similar in their situations by a matching process, it is possible to make them substantially more alike. That is what was attempted here by matching Hispanic students with Caucasian students on the 13 variable factors mentioned above. Because matched pairs attended the same school, an additional purpose was to compare test score results by size of school and type of school--i.e., public and Catholic.

Matching Process

First, a review was made of all high schools in America that had 10 or more Hispanic students and at least 10 Caucasian students who had completed the ACT assessment. Nationwide, 427 high schools were identified as meeting the criteria. Those schools enrolled 9,691 Hispanic students who had taken the ACT and were scheduled to graduate in the spring of 1987.

The second step was an attempt to match each Hispanic examinee with a Caucasian. A match required that each of the 13 variables be identical for the Hispanic and Caucasian student. When a match was located, that Caucasian student was not available for matches with other Hispanic students. From the matching process, 964 pairings were made when complete student data were available. Another 148 pairs were eliminated as data were incomplete for one or both students in the pair.

Demographics and Selected Test Results

Of the 964 matched pairs, 326 were students of Puerto Rican/Cuban/other Hispanic origins matched with Caucasian students. The other 638 pairs were Mexican-American/Chicano students matched with Caucasian students.

In the paragraphs and tables in this section, percentages are used as descriptors regarding how the student groups were situated. It should be recalled that Puerto Rican/Cuban students were matched with Caucasian students; hence, the percentages will be the same for both groups. Mexican-American and Caucasian students also will have identical percentage distributions.

An interesting sidelight analysis was the score comparisons of citizens and noncitizens. There were 67 Hispanic and 5 Caucasians who reported being in a noncitizen status. (Citizenship was not a matching variable.) There were no significant differences in subtest scores on the composite score of Hispanic citizens and noncitizens. Though "not significant" (i.e., could occur by chance in sampling), the test results in mathematics are interesting because noncitizen Hispanics outscored citizen Hispanic students. Could it be that noncitizens had an equal or better preparation in this area?

The study population had a slightly lower percentage of students in the bottom three income categories (below $24,000) than national population. The Puerto Rican/Cuban group exceeded the national percentage rate in the top three income levels ($24,000 and above). At these same levels, the Mexican-American/Chicano percentage exceeded the national averages except for $50,000 or higher. (See Table 1.)

The largest number of study group examinees was at the $24,000-$36,000 level, with about 32% of Puerto Rican/Cuban students and about 39% of Mexican-American/Chicano students at that level. (See Table 1.)

The number of each examinee's siblings under age 21 yielded little discriminating information. Approximately 96% of Puerto Rican/Cuban students and 94% of Mexican-American/Chicano students had 0-2 siblings. Only 3% of Puerto Rican/Cuban students and 6% of Mexican-American/Chicano students had 3-4 siblings under 21 years of age. Less than 1% of either group had more than 4 siblings. The small number of examinees with sibling count other than 0-2, made analysis unreliable relative to this variable. Given the matching process and the higher than average income levels, the small numbers are not surprising.

Table 1. Percentage Distributions by Income Levels: National Average, Puerto Rican/Cuban and Mexican-American/Chicano Group

	National Average	Puerto Rican/ Cuban	Mexican-American/ Chicano
$0 - $11,999	12%	9.2	9.9
$12 - $17,999	9%	7.7	8.2
$18 - $23,999	11%	7.4	11.0
$24 - $35,999	25%	31.9	38.9
$36 - $49,999	19%	20.2	19.7
$50,000 & above	18%	23.6	12.4

Males made up 41.7% of the Puerto Rican/Cuban group and 39.7% of the Mexican-American/Chicano group, while 58.3% of the Puerto Rican/ Cuban group and 60.3% of the Mexican-American/Chicano group were female. Males outscored females for both Hispanic and Caucasian groups in composite scores and all subtest areas except English. The same relationship was true for the Mexican-American/Chicano subgroup. In the Puerto Rican/Cuban subgroup, males outscored females in all test areas. There were no significant differences between Puerto Rican/ Cuban or Caucasian, or Mexican-American/Chicano and Caucasian males and females.

An examination of frequencies in mathematics classes taken or not taken reveals over 99% of both Puerto Rican/Cuban and Mexican-American/ Chicano students have taken algebra I. Over 80% Puerto Rican/Cuban, and over 75% Mexican-American/Chicano students have taken algebra II. Geometry was also taken at a high rate, 90% for Mexican-American/ Chicano and 9[illegible]% for Puerto Rican/Cuban. Trigonometry shows 30% of

Mexican-American/Chicano students and 44% of Puerto Rican/Cuban students taking the course while calculus shows only 4% of both groups having taken the class.

For science classes, 70% Puerto Rican/Cuban students and 72% Mexican-American/Chicano students reported having taken general science, while 95% Puerto Rican/Cuban students and 96% Mexican-American/Chicano students had taken biology. Sixty-nine percent Puerto Rican/Cuban students and 59% Mexican-American/Chicano students had taken chemistry, while 28% Puerto Rican/Cuban students and 17% Mexican-American/Chicano students had taken physics.

FINDINGS

The findings are reported in the following order:

- Test Score Comparisons Among Three Groups When Not Situated Similarly, National Reference Norms
- Test Score Comparisons Between Puerto Rican/Cuban Students and Caucasian Students and Mexican-American/Chicano Students and Caucasian Students When Similarly Situated
- Family Income and Test Results
- Size of High School Attended and Test Results
- Type of School Attended and Test Results
- Courses Taken and Test Results
- Worst and Best Case Scenarios
- Statistical Relationship of Study Factors with Test Scores: Stepwise Multiple Regression Analysis

Test Score Comparisons Among Three Groups: Puerto Rican/Cuban, Mexican-American/Chicano, and Caucasian Students Not Similarly Situated, National Reference Norms

The subtest and composite scores of the three groups are reviewed here for information and later for comparative purposes with the study groups. Scores reported for the three groups are national reference norms, and the students in those three normative groups were not matched; hence, students were situated differently with respect to school attended, courses taken, family income, and so on.

Among the three groups, Caucasian students scored highest on each of four subtests and the composite ACT score. Puerto Rican/Cuban students scored higher on all tests than did Mexican-American/Chicano students. The differences were least between Mexican-American/Chicano students and Puerto Rican/Cuban students, and greatest between Mexican-American/Chicano students and Caucasian students.

The average composite score of Caucasian students place them near the national average, 51st percentile, while the average Puerto Rican/Cuban students score yielded a 33rd percentile ranking, and Mexican-American/Chicano students average score provided a 26th percentile ranking.

On national reference norms, Caucasian students scored highest in social studies and natural sciences, 50th percentile, and lowest in mathematics, 46th percentile. Puerto Rican/Cuban students scored highest in mathematics and social studies, 36th percentile, and lowest in English, 30th percentile. Mexican-American/Chicano students scored highest in social studies, 33rd percentile, and lowest in English, 24th percentile. The difference among the three groups was substantial, demanding the attention and action of all those concerned with equality

and adequacy of American public education. (See Table 2 which follows.)

Table 2. Test Score Comparisons Among Three Groups--Students Not Similarly Situated--1987 National Reference Norms

Tests	Caucasians	Puerto Rican/ Cuban	Mexican-American/ Chicano
		(Percentile Ranks)	
English	.49	.30	.24
Mathematics	.46	.36	.31
Social Studies	.50	.36	.33
Natural Sciences	.50	.34	.28
Composite	.51	.33	.26

Test Score Comparisons Between Puerto Rican/Cuban and Caucasian Students and Mexican-American/Chicano and Caucasian Students When Similarly Situated

In the previous section, the marked difference in mean ACT test scores among the three groups was noted when the students were not similarly situated. In this section, the analysis of test score results is reported for students who were matched on 13 variables to yield similar situated matched pairs.

Comparisons were made between Puerto Rican/Cuban students and between Mexican-American/Chicano and Caucasian students. Comparisons between Puerto Rican/Cuban students and Mexican-American/Chicano students were not possible as these two groups had students matched individually with different Caucasian students. Thus, comparisons of scores of Mexican-American/Caucasian students with Puerto Rican/Cuban

students cannot be made with validity. How students in the two groups of Hispanics compared was not reported in the previous section, Demographics.

Mexican-American/Chicano and Caucasian
Test Score Comparisons When Similarly Situated

When Mexican-American/Chicano and Caucasian students were similarly situated, significant changes occurred in their reference group ACT scores:

- Differences in composite mean score points were 2.0 rather than the national difference of 4.4. Caucasians had a mean score of 18.7, and Mexican-American/Chicano students had a mean score of 16.7. National nonsimilarly situated scores were 19.6 and 15.2 respectively, for Caucasians and Mexican-American/Chicanos.
- Mexican-American/Chicano students' mean score rose 1.5 score points and the percentile rank increased 8 points.
- Caucasian students' mean score fell .9 score points, with the percentile rank dropping 6 points.
- Differences in mean composite test score percentile rankings between groups were reduced by 14 percentile points with the new rankings being 44th for Caucasian students and 33rd for Mexican-American/Chicano students.
- Decline between mean subtest scores between groups on a not similar basis and on a similar basis were considerable. The percentage reductions in differences in mean test scores were:

  55% English (from 3.8 to 1.7)

  69% mathematics (from 4.5 to 1.4)

  49% social studies (from 4.7 to 2.4)

  49% natural sciences (from 4.5 to 2.3)

Graphic and tabular comparisons of ACT scores of not similarly situated Mexican-American/Chicano students with Caucasian student examinees can be made from Table 3, Graph 3, page 44, in the appendix.

Comparisons of test scores for similarly situated students as described above can be made from an examination of Table 4 and Graph 4, page 45, in the appendix.

Puerto Rican/Cuban and Caucasian Student Test Score Comparisons When Similarly Situated

When Puerto Rican/Cuban and Caucasian students were similarly situated, numerous noteworthy changes occur in their respective reference group ACT scores:

- Differences in composite score points were .9 rather 3.0 with Caucasian students scoring 19.8 and Puerto Rican/Cuban students scoring 18.9.
- Difference in mean composite test scores between groups (Puerto Rican/Cuban and Caucasian) decreased 70%, from 3.0 to .9.
- Puerto Rican/Cuban students' mean composite scores increased 2.3 score points, and the mean percentile increased 13 points.
- Differences in percentile ranking became .06 (46th percentile vs. 52nd percentile), representing a 66% decrease in the previous difference.
- Declines between mean subtest score differences between groups on a "not similar basis" and on a "similar basis" were remarkable. The percentage reductions in differences in scores were:

  38% English (from 2.9 to 1.1)

  56% mathematics (from 2.7 to 1.2)

91% social studies (from 3.3 to .3)

67% natural sciences (from 3.3 to 1.1)

Graphic and tabular displays of data on test scores of not similarly situated and similarly situated Puerto Rican/Cuban students and Caucasian students are presented on pages 46 and 47 as Tables 5 and 6 and Graphs 5 and 6, in the appendix.

What the Findings Mean

Before discussing additional findings, it is appropriate to reflect and to draw conclusions based on the findings reported in the two previous sections.

When Mexican-American/Chicano students and Puerto Rican/Cuban students were matched with similarly situated Caucasian students, previous marked differences in mean ACT scores on subtest and composite results were dramatically reduced. In particular, Mexican-American/Chicano students increased and Caucasian students decreased in their recorded test results. Why? Because in reality many Mexican-American/Chicano students are "under-situated" vis-a-vis Caucasians. On a national basis, many Mexican-American/Chicano students are situated at a relative disadvantage, while many Caucasian students are situated at a relative advantage.

Test score differences between groups need not exist. When students are similarly situated, they will score equally. The problem is "how do we get from here to there" to have students similarly situated or to overcome the disadvantage of how they are situated? The answer is needed soon. America cannot afford to wait through one or two generations hoping for improvement. Success is contagious; so is educational failure. To wait for a miracle is to sentence a valued and

expanding segment of our society to continued inadequacy of educational outcomes. Some suggested "hows" to improve educational outcomes are presented later.

We now turn our attention to how factors are associated with test scores.

Family Income and Test Results

The important association of family income with student mean composite ACT scores can be noted from a review of Table 7 and Graph 7 in the appendix, page 48. Six income levels were utilized: (1) $0-$11,999, (2) $12,000-$17,999, (3) $18,000-$23,999, (4) $24,000-$35,999, (5) $36,000-$49,999, and (6) $50,000 or more. The following summary statements of findings can be made regarding the association of family income of Hispanics and Caucasian students with their mean ACT scores.

1. As family income rises so do composite mean test scores.
2. Hispanic scores increase between each of the six income levels for an overall gain of 4.5 score points. Scores increase from 15.2 at the $11,999 or less income level to 19.7 at the $50,000+ level.
3. Caucasian mean composite ACT scores increase between five of the six income levels. Score results for two levels, $12,000-$17,999 and $18,000-$23,999, were nearly identical, 18.0 and 17.9. A score increase of five points, from 16.2 to 21.2, was noted between the lowest and highest income levels for Caucasian students.
4. The association of income with mean ACT scores was quite similar for Hispanics and Caucasians. Overall mean test score

gains between lowest and highest income levels of 4.5 and 5.0 were made for Hispanics and Caucasians, respectively.

5. Gains in subtest scores followed a pattern similar to that for mean composite scores. Hispanic mean test scores increased between each of the six income levels. There were 20 cells where scores could increase, remain the same, or decrease (five changes of income levels for four subtests). In 19 of the 20 cells increases were recorded. For even the most skeptical, these findings should be sufficient evidence regarding the impact of income upon test score outcomes.
6. Gains in mean composite ACT subtest scores were recorded in 16 of 20 cells for Caucasian students. One cell recorded an equal score and three recorded a slightly smaller score.
7. Caucasian students in the lowest income level (below $12,000) had a mean composite score equal to or greater than Hispanics in the lowest three income levels, below $24,000. Hispanics in the top income level recorded a mean ACT composite score that equaled or exceeded scores in five of the six income levels for Caucasian students. (See Table 7, page 48, in the appendix.)

Yes, today family income level is associated significantly with test score outcomes of many of America's students. Those associations are both positive and negative. They are negative for far too many. It is difficult to achieve in school when you are hungry or constantly on the move to keep ahead of the rent collectors.

Size of School Attended and Test Results

The association of size of high school attended as reflected by five class size intervals with ACT mean test scores of both Hispanic and Caucasians, can be viewed in Chart 8 and Table 8, on page 49, in the appendix. Five high school size categories based on the number of students in the graduating class were utilized: (1) less than 200, (2) 200-399, (3) 400-599, (4) 600-899, (5) 900 or more.

The following summary of statements are made from an analysis of the data.

1. As the size of high school graduating class increased, so did composite mean test scores of both Hispanic and Caucasian students.
2. Hispanic scores increased between each of the five size intervals for an overall gain of 2.0, from 16.3 to 18.3.
3. Caucasian mean composite scores increased from 17.8 to 19.8 for a 2.0 gain. Gains were recorded between each size level.
4. The association of school size with mean ACT scores was positive and similar for Hispanic and Caucasian students. Identical gains in test scores were recorded for the matched pairs of students in the two study groups with both Hispanics and Caucasians increasing their scores 2.0.
5. Gains in subtest scores followed a similar pattern to that found in mean composite score gains. With five size intervals, four changes or no changes in scores were possible between cells for each subtest. Scores could increase, remain the same, or decrease. As size increased, the following changes were observed in mean subtest scores of Hispanics. The English subtest area showed gains across three interval

changes, and in one interval change, the scores stayed the same; in the mathematics, social sciences and natural sciences areas, increases were shown in three interval changes, and one interval change showed a decrease.

6. Utilizing the same pattern to observe Caucasian scores relative to changes in class size, the following were observed: In the areas of mathematics and natural sciences, there were increases in all four interval changes. English subtest scores showed increases over two interval changes, a decrease over one, and in one interval change, the score stayed the same. The social studies subtest areas showed increases over two interval changes and decreases over the other two.
7. Hispanic students in the largest two school size categories, graduates of 600-899 and 900 or more, had mean composite scores greater than Caucasians in the smallest school size category. (See Table 8, page 49, in the appendix.)
8. Caucasian students in the three largest school size categories, graduates of 400-599, 600-899, and 900 or more, compiled higher mean composite scores than the mean for Hispanic students at any of the five size levels.

It is known that the belief that "big is bad" was rejected relative to ACT test score achievement; big was better for both Hispanic and Caucasian students in this study. On a national basis, ACT scores increase as size of the graduating class intervals increase with the exception of the largest interval, 900 or more, where mean scores fall. The reasons "why" increased mean test scores were

recorded with an increase in each graduating class size interval is unknown.

Common sense would suggest that the increasing mean scores are associated with process, not with increased student abilities, at each level. Some of those process factors may include: teacher professional preparation, methodology, inservicing and supervision, instructional materials and equipment; curriculum coordination and support staff; and student competition, student academic assistance programs, and school climate; administrative expectations held, support, and departmental organization. The message for many smaller high schools is clear: "To be competitive in test score results, shortfalls in process arising from smallness must be overcome." Considerable research is needed here.

Type of School Attended and Test Results

A topic of constant debate and analysis concerns student test scores in public and Catholic schools. The research findings reported by James S. Coleman and Associates concerning test scores, general achievement, and other evaluative criteria, over time has heightened the debate. The findings reported here are contradictory to those reported by Coleman. In this research we sought answers to the following questions:

- Are there significant differences between composite and subtest scores of similarly situated Hispanic and Caucasian students in public schools and those in Catholic schools?
- Are there significant differences in test scores of Hispanic students in public and Catholic schools when the students are in the same family income level?

- Are there significant differences in test scores of Caucasian students in public and Catholic schools when the students are in the same family income level?

The data relating to the findings reported here can be reviewed in Tables 13, 14, and 15, pages 55-56, in the appendix. The findings reported here are believed to be of interest and value to all those who reflect upon comparative results of America's two largest school systems.

1. For the public schools, mean scores for all subtests and the composite mean score of Caucasians were found to be statistically greater than the mean scores of Hispanics.
2. An opposite finding occurred in Catholic schools. Only one statistical difference was noted among the four subtest areas (mathematics) and no significant difference existed in the mean composite score of Hispanic and Caucasian students.

It appears appropriate to speculate here about the opposite findings regarding student test score differences in the two systems. Why do such opposite results occur? One possible explanation is that there are different levels of expectations on the part of the students, student peers, teachers, administrators, and parents in the two systems. Enrollment in a Catholic school is a conscious act by the student's family and with that act comes parental expectations for their child. That expectation may also be prevalent in others involved in the school setting. This may or may not be the case in the public school system. As will be noted later, parental expectations and motivations are essential for improving student achievement in both systems.

Another plausible explanation for the difference is that the income levels of students were higher in Catholic schools than in public schools. With higher family income levels may also come higher expectations for both groups. Those higher expectations may be held by several groups that may influence achievement outcomes--the students, peers, teachers, administrators, and parents. In the public schools where student income levels are lower, lower expectations and motivations may arise, particularly among minorities and underclass citizens and, in this particular study, Hispanics.

From the previous discussion one should not conclude superiority or inferiority of one of the two systems. As will soon be observed, family income level has a significant influence on student test results in both public and Catholic schools.

Hispanic students achieve equally well in both systems when their family income level is considered. That is, no statistical difference was observed in mean composite scores between Hispanics in public schools and those in Catholic schools when their family income level was the same. In the four subtest areas for each of the six income levels, only four of 24 subscore comparisons were found to be significantly different between the Hispanic students in the two systems. There were no statistical differences noted on the mean composite score or any subtest scores between Caucasian students in public and Catholic schools in this study. With four subtests and one composite score for each of the six income levels, 30 tests for differences were conducted. All 30 tests produced findings of no statistical differences between the two systems.

It is important to observe that while the two systems appear to produce different student test score results, they have, in fact,

similar student results when students come from similar family income levels. This study thus adds further evidence that no differences exist between the test score outcomes of the two systems. Suffice it to say that too frequently test score comparisons are made by researchers without adequate research controls. Our findings raise concern regarding expectations and motivations for Hispanic students vis-a-vis Caucasian students in public schools, and more research is needed in this area.

Courses Taken and Test Results

A "common sense" belief is that the more academic coursework taken, the higher a student's test results should be. What we attempted to do here was to determine:

- How do ACT subtest scores and composite scores differ between groups of students that have and have not taken certain coursework?
- What coursework appears to be strongly associated with higher student test results?
- Are there marked differences between Hispanic and Caucasian matched pairs of students who pursue substantially different curricular or coursework programs?

Time will not permit a detailed report of our findings. Reported here are highlights of the complete findings. Attention is directed to Tables 9, 10, and 11 and Graphs 9, 10, and 11, pages 50-52, in the appendix, for a review of summary data findings.

Care must be exercised in interpreting the data regarding coursework taken, not taken, and test scores. Some definite associations are apparent, however. The major point to be recalled

when reviewing the data and explanations offered is that students, as a group, who have completed advanced courses may have a greater capacity to achieve than the group of students who have not completed the coursework. The $64,000 question then is "How much better would students score if they had taken the advanced coursework?" Surely some, and perhaps a sizeable portion, of students would achieve near or beyond the mean of those who did take the coursework. You will need to do your own speculating on this one.

The data clearly indicates that students who have taken advanced coursework in geometry, chemistry, trigonometry, physics, and calculus scored substantially higher than those who have not taken the courses.

Table 10-1. Test Score Comparisons of Hispanic Subgroups According to Courses Taken and Not Taken

	COMPOSITE TEST SCORE Mexican-American/Chicano*			COMPOSITE TEST SCORE Puerto Rican/Cuban		
	Percent Taken	Taken	Not Taken	Percent Taken	Taken*	Not Taken
Geometry	90	17.3	11.7	96	19.3	10.0
Chemistry	59	18.9	13.5	69	20.6	14.7
Trigonometry	30	20.6	16.2	44	21.7	16.3
Physics	17	20.6	15.6	28	21.8	16.8
Calculus	4	23.3	16.2	4	22.5	18.0

*Percent of Caucasians would equal to that for Mexican-American/Chicano and Puerto Rican/Cubans as each Caucasian was matched to be identical in coursework.

**See Table 10, on page 51, in the appendix, for combined group results, i.e. Hispanics.

It is interesting to note that a substantially higher percentage of Puerto Rican/Cuban students have taken advanced coursework than have Mexican-American/Chicano students: chemistry 69% vs. 59%, trigonometry 44% vs. 30%, physics 28% vs. 17%. The reason for differences in coursework taken may result from differences in income levels and from differences in expectations on the part of the students, their peers, parents, etc. Clearly, the fewer the students in advanced coursework, the lower that group's mean composite score. This appears to be associated with score differences between the two Hispanic subgroups. When comparisons were made of coursework of Puerto Rican/Cuban and Mexican-American/Chicano students in the two top family income levels ($36,000 and beyond), Puerto Rican/Cuban students continued to take substantially more advanced coursework: physics 39% vs. 22%, chemistry 71% vs. 61%, calculus 15% vs. 7%. The differences here were not related to gender or grade point average. Both groups were nearly identical on these two factors.

To compare how students scored who had and had not taken certain courses, examinees were placed in four basic groups:

- Basic Program--those who had taken algebra I, algebra II, geometry, biology, English and social studies.
- Plus One--basic program plus chemistry.
- Plus Two--basic program plus chemistry, plus trigonometry.
- Plus Three--basic program plus chemistry, plus trigonometry, plus calculus.

Scores of students were lowest in the Basic Program group. When an additional advanced course was taken in each of three other study groupings by course taken, scores were progressively higher.

As a group, Hispanics in the Basic Program group scored 19.0 compared with 23.6 in the Plus Three group. Caucasian students had score increases from 20.2 to 25.7 between the same group comparisons. (See Table 9, page 50, in the appendix.) As would be expected, the greatest gains from advanced coursework in chemistry, trigonometry, and calculus were in mathematics and science, with substantially smaller gains in social studies and English. (See Tables 10 and 11 and Graphs 10 and 11, on pages 51-52, in the appendix.) Score differences of nearly 8 points were noted in mathematics, and approximately 4.5 score points were seen in natural sciences. From the tables and graphs, it can be noted that the test score improvement was nearly equal for Hispanics and Caucasians relative to additional coursework.

From the findings of a separate statistical analysis (stepwise multiple regression), which are reported in the section which follows, coursework was found to contribute significantly to test scores. Suffice it to say that trigonometry and chemistry were first and second in importance with composite scores for both Hispanics and Caucasians. The third, fourth, and fifth most important classes associated with test scores for Hispanics were: algebra II, calculus, and geometry; and for Caucasians were: physics, geometry, and calculus.

Test scores of all groups, Puerto Rican/Cuban and matched Caucasians, and Mexican-American/Chicano and matched Caucasians were associated similarly with coursework taken. (See Tables and Graphs numbered 9, 10, and 11, on pages 50-52, in the appendix.) Once again, we observe that it is not race nor ethnicity that is most important. Rather, <u>all groups</u> are affected in the same way by the same factors.

Worst and Best Case Scenarios

We have reviewed how students compare on test scores based on how they are situated with respect to gender, to family income level, to size, and to type of school attended, and to specific courses taken or not taken. The obvious question to ask now is: What happens to test scores when students are grouped on a "best" and "worst" basis of several factors, not just one factor? To answer the question Hispanic and Caucasian pairs of students were identified that had what appeared to be the best and worst situations. Subtests and composite scores were then compared.

The basis for assigning students to a group were:

Factor	Worst Case Scenario	Best Case Scenario
High School Size--Graduating Class	Less than 200	600 or more
Family Income	Less than $18,000	$36,000 or more
Courses:	No physics, no chemistry	Physics or chemistry or both
Courses:	No trigonometry, no calculus	Trigonometry, calculus or both

Eleven pairs of Hispanic and Caucasian students from the 964 pairs in the study were identified as being in a "hypothetical worst situation." Eighteen pairs were identified as being in a "hypothetical best situation." Comparisons of the test score results from the analysis can be noted from a review of Tables 12-1 and 12-2, on page 54, and Graphs 12-1 and 12-2, on page 53, in the appendix.

Students who were in the worst situation had extremely low mean composite scores (12.5 Hispanic and 16.8 Caucasian). Those in the best situation had mean composite scores of 21.8 and 23.4. A 9.3 average score difference between "best and worst" situations was found for

Hispanic students and 6.6 for Caucasian students. For those who are poorly situated, college prospects also appear poor. We observe here the strong likelihood of discarded student opportunity, which falls more heavily upon Hispanics than upon Caucasian students.

The closeness of composite scores, 21.8 for Hispanics and 23.4 for Caucasians in the best situation is noted with interest. When Hispanics become better situated, their test scores increase more than Caucasians. It is also interesting to note that differences in subtest score results are reduced dramatically as Hispanic and Caucasian students become better situated; no difference, for practical purposes exists (.2) in the subtests areas of natural sciences and social studies.

Many of you have observed and have struggled to overcome what has been described in this report. Clearly, we must overcome or eliminate those factors associated with low student achievement.

Statistical Relationship of Study Factors With Test Results

This section is included for those who desire a more precise statistical analysis overview. Some readers may prefer to bypass this section and go to the next major section: REVIEWING THE SITUATION, page 33.

The statistical relationship of the study factors or variables with subtest and composite score results is reported here. Step-wise multiple regression analysis was utilized. Multiple regression correlation results are presented in Tables 16 and 17, on pages 62-63, in the appendix. Only the first five variables of the 13 to enter the equation are reported.

Hispanic Matched Variables

This section summarizes the statistical association of the 13 matched variables with ACT test scores of Hispanic students.

Enrollment or nonenrollment in four specific courses combined to provide the best predictors of ACT composite test scores for Hispanic students. The courses included three mathematics and one science course; they were: trigonometry, calculus, algebra II, and chemistry. Nearly 40% of the variance in ACT scores of Hispanics was associated with whether students had or had not taken the four courses ($R = .61$, $R^2 = .37$). The other 10 variables, when entered into the prediction equation, contributed less than 3% to the association.

The four courses (variables) noted above were also found to have the closest association among variables with subtest scores in English and mathematics.

In the social studies subtest, geometry and family income level variables replaced algebra II and calculus, with chemistry and trigonometry retaining first and second importance, respectively. For natural sciences, chemistry and trigonometry maintained their positions followed by gender and family income.

The predictive value of the variables was less for three of the four subtest scores than it was for the composite scores. The test variance associated with the specific four variables discussed above and the subtest scores were: 19% for English, 22% for social studies, 31% for natural sciences, and 42% for mathematics. Adding the additional 10 variables adds little predictive power.

Words of caution are now in order. First, because a variable adds little explanatory value to a prediction equation does not mean that it has little importance nor that it has little association with the test

score results. It merely means it provides little help in increasing the explanation of differences or prediction. When variables are closely interrelated, they will be similarly related to another variable. In other words, one variable may be a proxy for one or more other variables which occur frequently in this study. Consider that while trigonometry was most important in the equation, algebra II and geometry are also important as they are completed before enrolling in trigonometry. Second, cause and effect relationships cannot and are not proven in this analysis. Rather, we are talking about associations, which frequently require further thought and investigation. For example, gender and family income were the third and fourth most important variables associated with the prediction of natural sciences scores of Hispanic students. Being either male or female of itself does not cause a student to score high or low. Whether a student has or has not taken a specific course may be more important. (In the case in question, relatively fewer female students took physics which may well account for the significance of the variable.) Family income itself does not cause one to score high or low, as students from all income levels score both high and low. What we are concerned about are average or mean scores and the distribution of scores within an interval. It is believed that courses taken, parent, student, and school expectations impact more than the family income interval, but where one is situated with regard to family income may well determine parent, student, and school expectations, motivations, courses of study, and hence enhancement or restriction of test scores. If the example holds, the real cause(s) of score variation is not income. Instead, score variation results from other things, many of which may be influenced by, or partially controlled by,

the principal, teachers, and schools. We will return to this point later in this paper, as it provides great opportunity and hope.

To summarize here, Hispanic test scores were positively associated with courses taken, and in particular with trigonometry, calculus, algebra II, and chemistry. The association of family income and gender was also observed.

Caucasian

Results similar to those found for Hispanics were observed for Caucasian Americans regarding the association of variables with test score results. The similarities and dissimilarities are noted below.

For the ACT composite score, trigonometry and chemistry were reported as the first and second most significant explanatory variables for Caucasian scores. Physics and geometry replaced algebra II and calculus which were third and fourth position for Hispanics. The explanation strength of the equation for Caucasian scores of approximately 40% ($R = .61$ $R^2 = .38$) was identical. The other 10 variables, when entered into the multiple regression equation, added little explanatory power, less than 3%.

For the English subtest three of the four most significant variables (chemistry, trigonometry, geometry) were the same for Caucasians and Hispanics. Calculus, which rated sixth for Hispanics, was fourth for Caucasians. For mathematics scores, trigonometry and chemistry entered the equation as the two best predictive variables among the 13 studied. Physics was the third most meaningful variable among the 13 variables associated with mathematics scores.

For the social studies subtest, the four best combined predictors, in order, were trigonometry, chemistry, physics, and family income

level. It is interesting to note that chemistry, family income level, and trigonometry were also among the top four variables for Hispanic social studies scores.

Trigonometry, chemistry, physics, and gender, in that order, were most significantly associated with natural sciences test scores of Caucasians. When compared with the top four variables associated with Hispanics natural sciences scores, physics replaced family income.

The predictive strength or explanatory value of the study variables were approximately the same for Caucasian and as for Hispanic subtest scores. The top four of 14 variables were associated with the subtest score variance for Caucasians as follows: 21% for English, 19% for social studies, 30% for natural sciences, and 46% for mathematics (R = .45, .44, .55, and .68, respectively). The introduction of the other 10 variables adds little to the explanatory value of the predictive equations for subtest scores.

REVIEWING THE SITUATION

We have observed many factors, both positive and negative, associated with test scores. Those factors are very important and become even more so when we consider recent and future demographic changes in the United States. Changes are occurring that are certain to impact more than ever upon students and upon student achievement. We are talking about increasing numbers of underclass citizens, more children living in poverty, fewer middle class people to support education, and an increasing apathy toward public education.

Before making recommendations, it seems appropriate to review the situation in which American public education finds itself in 1988, and to review what demographic changes that are forecast.

Consider please:

1. From 1978 to 1983, the number of poor people increased from fewer than 25 million to more than 35 million.
2. The rich are becoming richer, the poor poorer. In the first half of the 1980's, the top 40% of families had annual income increases of $1,800, while the poorest 40% actually dropped $500.
3. A child under six today is six times more likely to live in poverty than is a person over 65.
4. More than one-half of all children who live with single mothers also live in poverty.
5. Twenty-five percent of the 3.6 million children who began public school last year live below the poverty line.
6. Children make up 40% of America's poor.
7. Forty-three percent of Black children live below the poverty line, and nearly 14% of all children in America live below that line.
8. Twenty-three of the largest 25 United States cities have majority/minority enrollments.
9. The median age in the United States is increasing: Today it is 30, in 10 years it will be 35; and, in 30 years it will be 40. Those over 65 now outnumber teenagers for the first time in the history of this country.
10. Today only 28% of the United States adult population have children in school. Sixty-four percent of households today have no children at all--in or out of school. In the early 1950's, nearly 70% of the adult population had children in school.

11. The number of white children in public schools decreased by six million from 1972-83; and Hispanic students increased one million.
12. Public school enrollment is now 40% minority. From 1985-2000, 60% of the United States population growth rate is projected to occur in minority populations: 23% growth in Blacks, 45.9% in Hispanics, 48.4% in other minorities, 6.5% in the White population, and an increase of 12.3% in overall population.
13. The percentages of people 18 to 24 years of age who have completed high school were: Whites, 83%; Blacks, 75%; Hispanic, 60%; and those enrolled in college were: 28% White, 20% Black, 18% Hispanic.
14. Between 1974 and 1984, the percent of United States graduates certified to teach and who had bilingual training dropped from 21% to 9%.
15. Between 1974 and 1984, the percent of minorities certified to teach dropped dramatically, Blacks from 29.2% to 14.4%, and Hispanics from 16.7% to 11.5%.
16. By the year 2000, or soon thereafter, the minorities will become the majority of people in the southwest United States under age 30. These people are underrepresented in education at all levels today.
17. California public school enrollment is 25% Hispanic, while only 6.6% of the teachers are Hispanic.
18. Minority representation on college and university faculties is less than in elementary and secondary schools.
19. Fertility rates among Whites in the United States is 1.7 per female, which means a decline in population as 2.1% is needed

for stability. Current fertility rate for Hispanics is 2.9 children per female which equals the United States rate during the baby boom.

20. Families earning less than $10,000 annually (all races and ethnic groups included) had a fertility rate beyond the 2.1 replacement level. When family income tops $35,000, fertility rate drops 1.3. Fewer than half of all married couples have children, and the fastest growing category of households is the childless one.
21. The United States is the destination of 2/3 of the world's immigrants. We are now approaching the record immigration years of the early 1900's.
22. One-third of the world's immigrants go to one state, California, where currently about one out of six or 16% of the public school enrollment is immigrant students. A five to seven percent growth in California in immigrant students is expected annually for the next 10 years.
23. The number of students with "limited proficient English" is growing. Today only two in five immigrant children who lack proficiency in English are being taught by a certified bilingual teacher in the state of California.
24. Federal support for public schools is at its lowest level in 20 years. Yes, there is need to pray in the schools!

Based on this list of America's changing demography, many difficult questions can be raised. Their answers are certain to have a profound impact upon American public education. David Martin asks: "Will this country's aging white, childless majority pay more for taxes to support a school system that increasingly serves children who are

non-white, poor, immigrant, and at-risk?" Most of us realize that a "yes" response will not come easily. The responses will likely vary by region and by state. An essential key response, an affirmative one, must come from the Federal government if this country, and its people, are to achieve their ultimate potential.

One must ask if the current educational problems of states like California, Texas, Florida, and Illinois are solely the problems of those states, or are they a problem for all of us in America? Are children who are members of an underclass, a minority, or an immigrant family the concerns only of the state in which they reside? The answer is that they are all children of America and we must be concerned about all of America's children. We in education will do our part, and we will do more, but we cannot overcome society's problems and those of our economic and educational system without efforts yet to be exerted in this country.

RECOMMENDATIONS

Based on these research findings about student achievement and a review of the current and future demographic make-up of America, the following recommendations are advanced for consideration:

- Federal government must play an increasing role in public education. Increased federal funding is essential. Today the national defense budget is 36 times greater than the federal budget for K-12 public education, with the defense budget's annual increases exceeding the total federal budget for K-12 public education.

  The old economic question of guns or butter remains with us. In this case, can we continue to spend nearly $300 billion

on national defense, external defense if you will, and ignore the needs for an internal defense against those factors curtailing educational achievement?

It is recommended that the federal outlay for K-12 public education be increased nearly five fold from $8 billion to $40 billion. On the average this would generate $1,000 per student. Financial assistance should be for both targeted and general aid. Federal aid dollars must not replace state and local dollars. They must supplement.

Where should the increased federal money go? It should be distributed primarily to states with the highest poverty levels, highest immigration numbers, largest cities and largest school populations. Fiscal capacity of states should be considered in the allocation process.

Money is needed to increase numbers of bilingual teachers and teachers from minority groups. This cannot be accomplished through state monies alone. Iowa, as an example, cannot afford to prepare at state cost a large number of bilingual teachers for Florida, Texas, and California, nor can most other states.

- States must continue to strive for educational excellence and ensure that equal educational opportunity for all is being pursued. State finance plans must be modified to better meet the needs of school systems with high percentages of students who are poor, undereducated, and at-risk. Experimental and demonstration centers can be both encouraged and established by state departments of education. America's rapidly expanding bilingual multicultural society should be reflected in curricular offerings of local school systems in each of our 50

states. Newly mandated state curricular offerings reflecting multicultural literacy should be offered and taught by teachers who have been adequately prepared prior to state certification. This is a minimum first step that all states can take.

- School districts must continue their attack on the problems of society that have been thrust upon them for correction. New policies and commitments are needed to advance all children to the extent possible. High expectations are a must at all levels. Unless high expectations and commitment exists throughout the system (Board members, superintendent, principals, teachers, staff and students) maximum achievement potential will be restricted.

  To improve their support base, schools must establish cooperative relationships and be willing to accept assistance from business, industry, parents, other governmental agencies, and retired groups. New approaches must be tried, evaluated, and shared when they are successful. The outstanding work of 44 of America's largest districts (Council of Great City Schools) is exemplary for all schools. The great city schools have attacked the problems that have been described here today with above-average success. Districts nationwide should adopt the programs that have been found to be successful in the great cities. Districts must also try their own new approaches to confront their local problems.

- Universities-colleges can and must play a significant role. America needs more well-educated bilingual and minority teachers. They must be recruited and adequately prepared. All teacher preparation must be superior to that of previous years.

Teachers need special preparation to work effectively with parents, an essential ingredient in the recipe of success which is frequently ignored today.

Universities and colleges throughout this country should also increase minority representation on their faculties and in their student bodies. More minority school administrators should be prepared and placed throughout America's schools. Universities and colleges can help break the placement of minorities in predominantly minority schools.

A review of college admission requirements must be made. Unless it can be demonstrated that the admission requirements do, in fact, have high predictability for academic success or failure of underclass, minority, and immigrant students, those procedures should be modified or set aside.

- Principals must continue to strive to overcome increasing odds against success of many of their students. What is the single best way to change the odds? Set high expectations.

The philosophy and practices of the effective schools movement does make a difference, a big difference. Commitment by all to that philosophy remains the challenge of the principal. For secondary principals, a broad perspective is necessary. Sometimes new or reallocated monies will be best spent at the preschool or elementary level to alleviate future problems in secondary schools. Do not fight those efforts. Support them.

A constant task for the principal will be to ensure fairness for all. Acceptance of high expectations requires commitment from many, including students, parents, teachers,

community, and frequently the central office and board of education. You must be an effective salesperson here. Encourage and support your faculty to test new approaches and programs. When replacing teachers, place special emphasis upon recruitment and screening. The appointment that is made will have a positive, or negative, impact for the next 10, 20, or even 40 years. All teachers new to your school should be committed to the effective schools philosophy that all children can learn.

- Teachers are the key ingredient to our future success. The principal who helps, cares, serves, and facilitates the work of the teacher will have gained a better teacher. Suffice it to say that teachers, like principals, make a substantial difference in student outcomes.
- Counselors must ensure that at all levels students are not academically stereotyped or tracked in such a way that will endanger future college admission or college success. Coursework in college preparatory curriculum does make a big difference in test score improvement and achievement. Special attention must be directed toward improving the self-esteem and raising the expectations of the underclass and minorities. The underachievement of those two groups is portrayed here, but, more importantly, a clear portrait of students overcoming adversity has been sketched.
- Parents must become involved as never before in education. It is obvious that support for education will be difficult to achieve from the general electorate. Parents, as a group, will need to mobilize to overcome apathy in the general electorate

toward public education in the immediate decades ahead. Schools must not only work with parents, but in many cases educational programs must be provided for them. In this way parents will be better enabled to help their children. (See Challenges to Urban Education: Results in the Making.) The parental support and participation that is frequently observed at the elementary level must not be permitted to wane for parents of children in the middle/junior high and high school levels.

- Community involvement in education is essential for success. The community is a stake holder with much to gain or lose. Business and industry are awakening to the high costs of training the undereducated, the decreasing productivity of undereducated workers, and the widening gap between their productivity and that of their worldwide competitors. Many cooperative programs can be developed between business, industry, and schools. General support of high expectations are needed along with financial support. Business and industrial leaders need to recall the fact that a better product costs more initially but is least expensive in the long run.

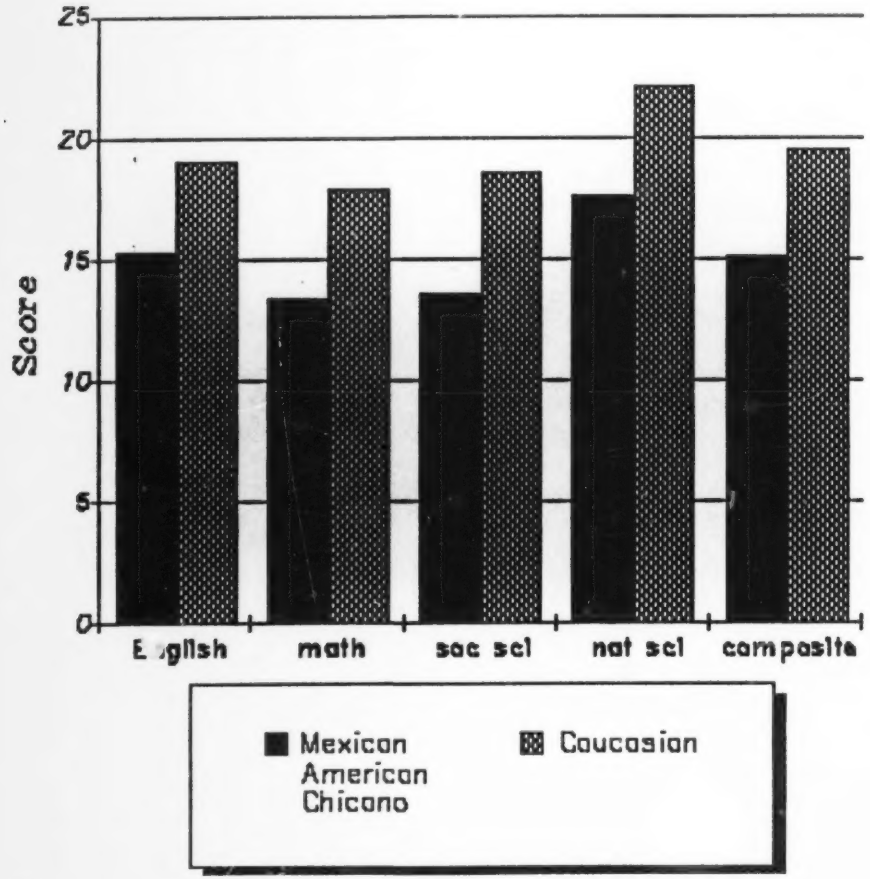
Concluding remarks--When all segments of our government and society work together to attack the problems that confront public education, success will follow. When opportunity becomes equal, so will student achievement for all of America's children--this country's best hope for the future.

You may now return to your former position, hopefully with even greater appreciation for the principalship and the Secretary of Education.

APPENDIX

ACT Scores of Not Similarly Situated Mexican American/Chicano and Caucasian Examinees

Graph 3*



*There are no graphs number 1 and 2. Graph 3 is the first to be presented. This numbering procedure is to keep the graphs in numeric order with their corresponding tables.

Table 3

Subject	Mexican American Chicano	Caucasian
English	15.4	19.2
Mathematics	13.5	18.0
Social science	13.7	18.4
Natural science	17.7	22.2
composite	15.2	19.6

Source. Data from American College Testing Program, Inc., Iowa City, Iowa. Compiled by George A. Chambers, Phyllis Peterson, and Joon Yul Choi, Division of Educational Administration, University of Iowa, Iowa City, IA 52242 for 1988 Annual NASSP Convention.

ACT Scores of Similarly Situated Mexica American/Chicano and Caucasian Examinees

Graph 4

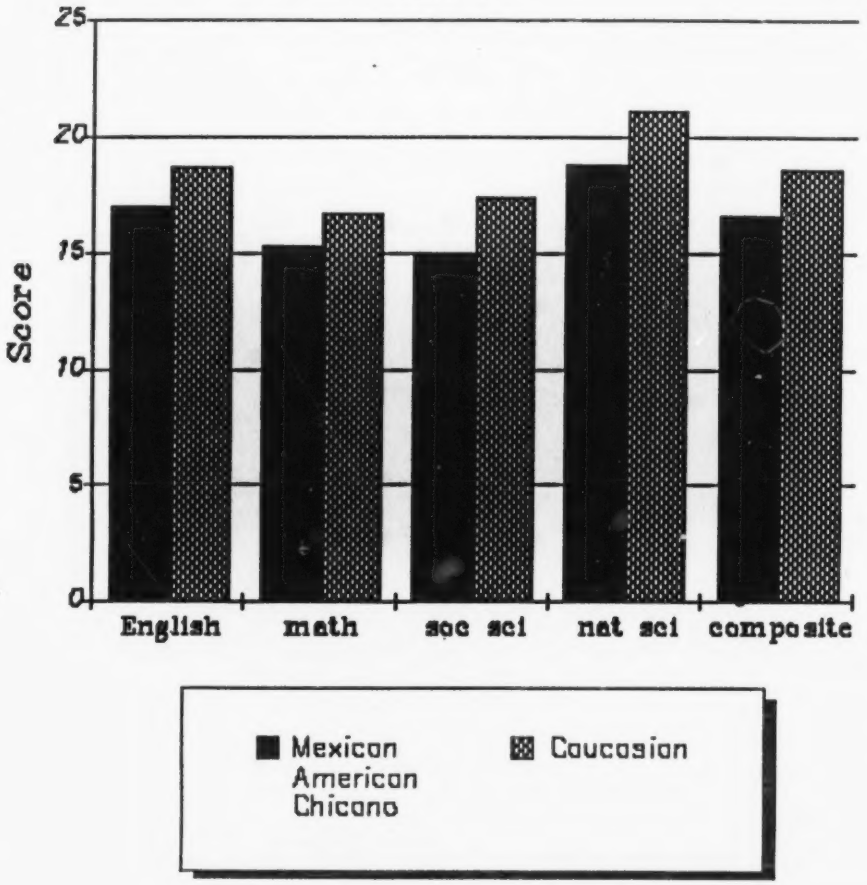


Table 4

Subject	Mexican American Chicano	Caucasian
English	17.1	18.8
Mathematics	15.4	16.8
Social sciences	15.1	17.5
Natural sciences	18.9	21.2
Composite	16.7	18.7

Source. Data from American College Testing Program, Inc., Iowa City, Iowa. Compiled by George A. Chambers, Phyllis Peterson, and Joon Yul Choi, Division of Educational Administration, University of Iowa, Iowa City, IA 52242 for 1988 Annual NASSP Convention.

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ACT Scores of Not Similarly Situated Puerto Rican Cuban and Caucasian Examinees

Graph 5

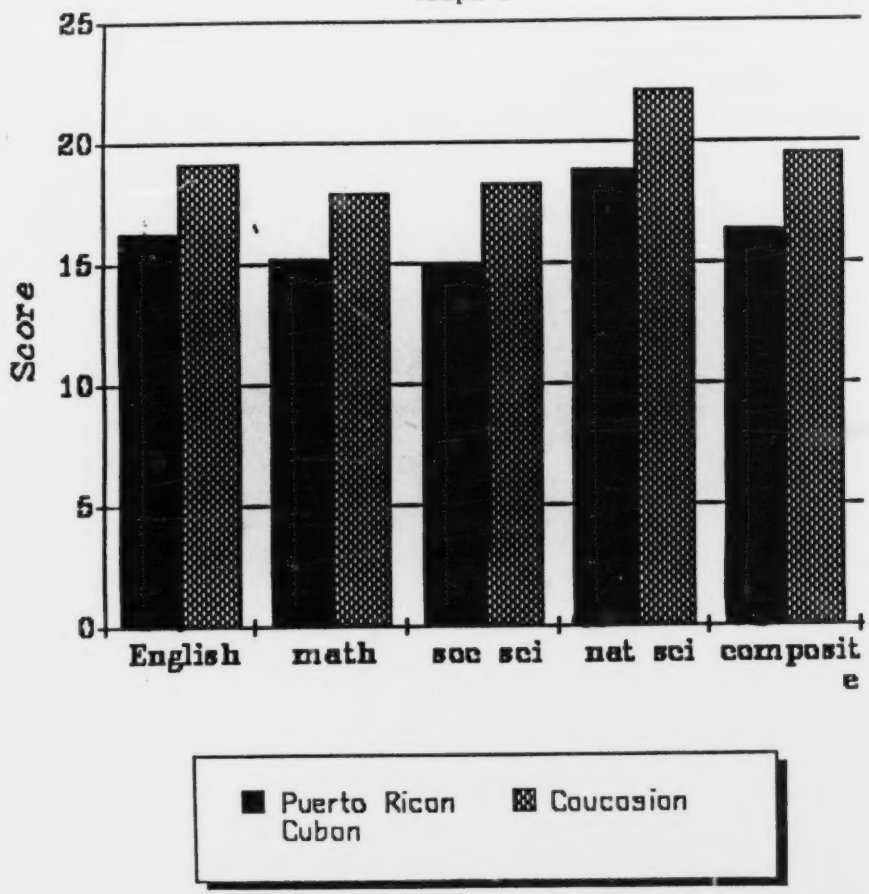

Table 5

Subject	Puerto Rican Cuban	Caucasian
English	16.3	19.2
Mathematics	15.3	18.0
Social science	15.1	18.4
Natural science	18.9	22.2
composite	16.6	19.6

Source. Data from American College Testing Program, Inc., Iowa City, Iowa. Compiled by George A. Chambers, Phyllis Peterson, and Joon Yul Choi, Division of Educational Administration, University of Iowa, Iowa City, IA 52242 for 1988 Annual NASSP Convention.

ACT Scores of Similarly Situated Puerto Rican Cuban and Caucasian Examinees

Graph 6

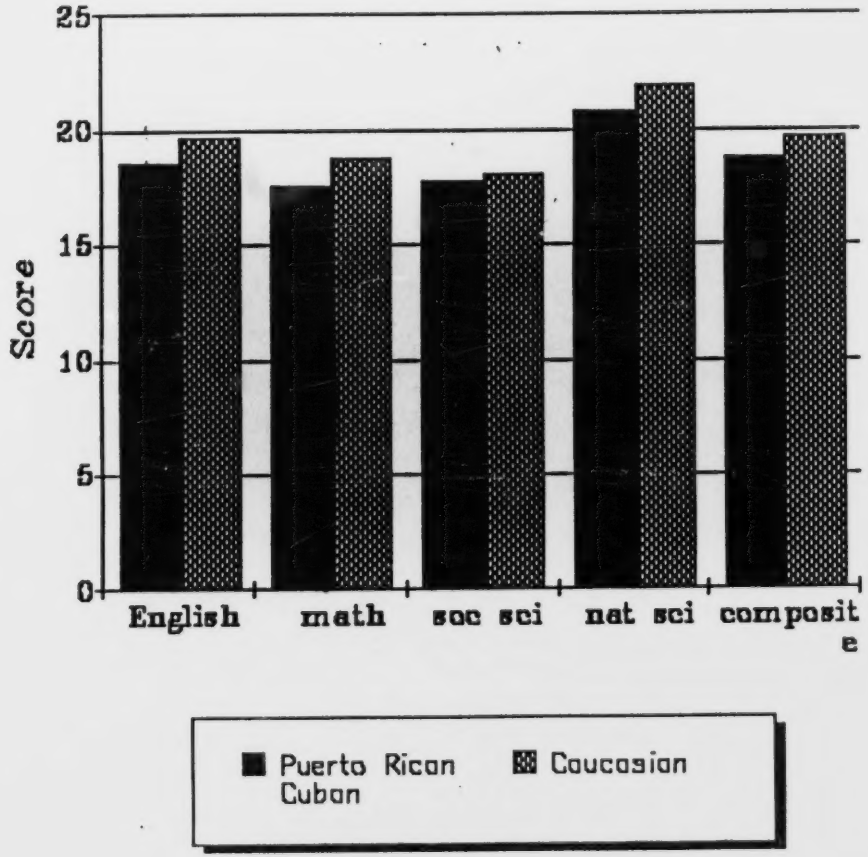

Table 6

Subject	Puerto Rican Cuban	Caucasian
English	18.7	19.8
Mathematics	17.7	18.9
Social science	17.9	18.2
Natural science	20.9	22.0
Composite	18.9	19.8

Source. Data from American College Testing Program, Inc., Iowa City, Iowa. Compiled by George A. Chambers, Phyllis Peterson, and Joon Yul Choi, Division of Educational Administration, University of Iowa, Iowa City, IA 52242 for 1988 Annual NASSP Convention.

Hispanic and Caucasian ACT Composite Scores by Income Level

Graph 7

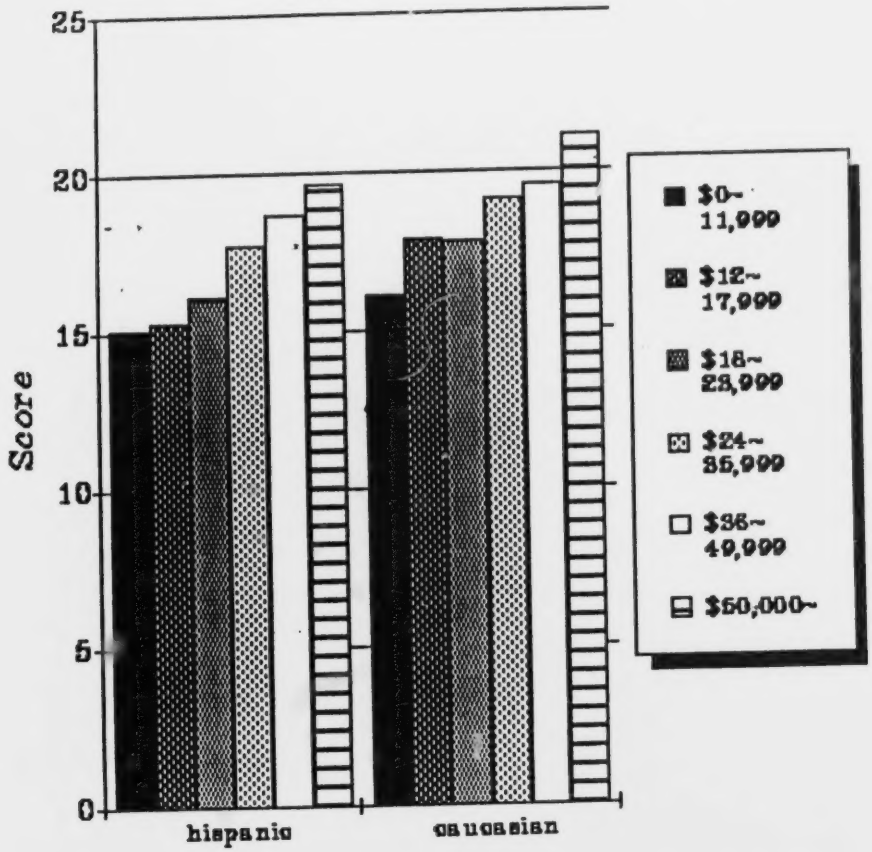

Table 7

Income level	Hispanic	Caucasian
$0 ~ $11,999	15.2	16.2
$12,000 ~ $17,999	15.4	18.0
$18,000 ~ $23,999	16.2	17.9
$24,000 ~ $35,999	17.2	19.2
$36,000 ~ $49,999	18.8	19.7
$50,000 or more	19.7	21.2

Source. Data from American College Testing Program, Inc., Iowa City, Iowa. Compiled by George A. Chambers, Phyllis Peterson, and Joon Yul Choi, Division of Educational Administration, University of Iowa, Iowa City, IA 52242 for 1988 Annual NASSP Convention.

Hispanic and Caucasian ACT Composite Scores by High School Size of Graduating Class

Graph 8

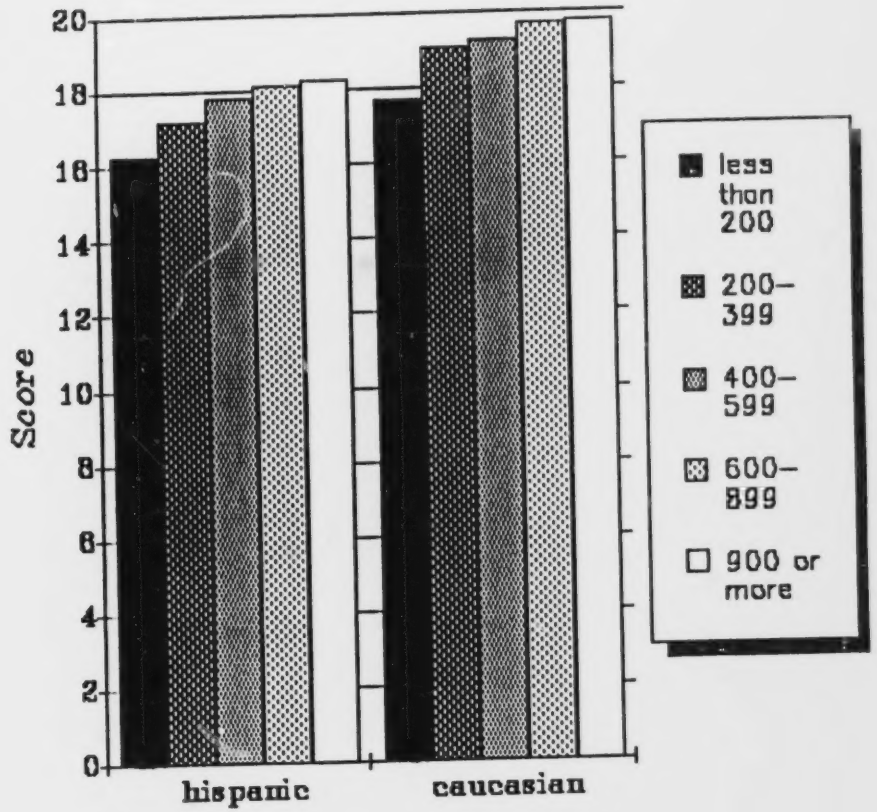

Table 8

Graduating class size	Hispanic	Caucasian
Less than 200	16.3	17.8
200 ~ 399	17.2	19.1
400 ~ 599	17.9	19.3
600 ~ 899	18.2	19.7
900 or more	18.3	19.8

Source. Data from American College Testing Program, Inc., Iowa City, Iowa. Compiled by George A. Chambers, Phyllis Peterson, and Joon Yul Choi, Division of Educational Administration, University of Iowa, Iowa City, IA 52242 for 1988 Annual NASSP Convention.

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Hispanic and Caucasian ACT Composite Scores according to the Courses Taken

Graph 9

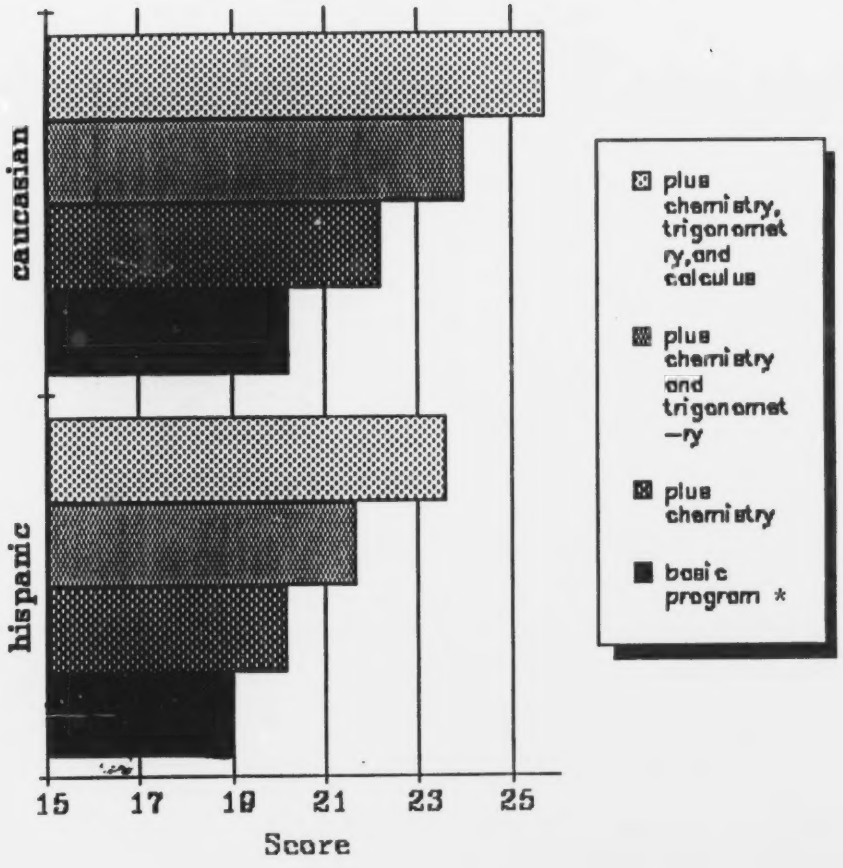


Table 9

Courses taken	Hispanic	Caucasian
Basic program	19.0	20.2
Plus chemistry	20.2	22.2
Plus chemistry and trigonometry	21.6	24.0
Plus chemistry, trigonometry, and calculus	23.6	25.7

*Basic Program: Algebra I, Algebra II, Geometry, Biology, English, Social Studies

Source. Data from American College Testing Program, Inc., Iowa City, Iowa. Compiled by George A. Chambers, Phyllis Peterson, and Joon Yul Choi, Division of Educational Administration, University of Iowa, Iowa City, IA 52242 for 1988 Annual NASSP Convention.

Hispanic ACT Scores according to the Courses Taken

Graph 10

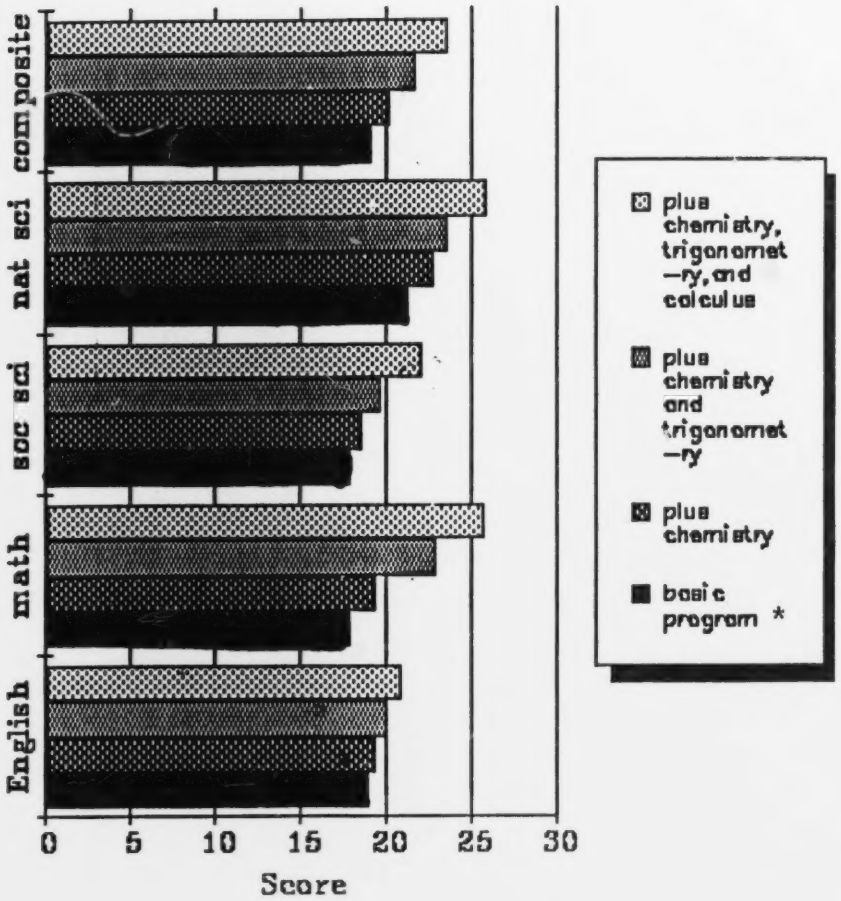


Table 10

Courses taken	English	Mathematics	Social science	Natural science	composite
Basic program	18.8	17.8	17.8	21.2	19.0
Plus chemistry	19.4	19.4	18.5	22.7	20.2
Plus chemistry and trigonometry	20.0	22.8	19.6	23.5	21.6
Plus chemistry, trigonometry, and calculus	20.9	25.6	22.0	25.8	23.6

*Basic Program: Algebra I, Algebra II, Geometry, Biology, English, Social Studies

Source. Data from American College Testing Program, Inc., Iowa City, Iowa. Compiled by George A. Chambers, Phyllis Peterson, and Joon Yul Choi, Division of Educational Administration, University of Iowa, Iowa City, IA 52242 for 1988 Annual NASSP Convention.

Caucasian ACT Scores according to the Courses Taken

Graph 11

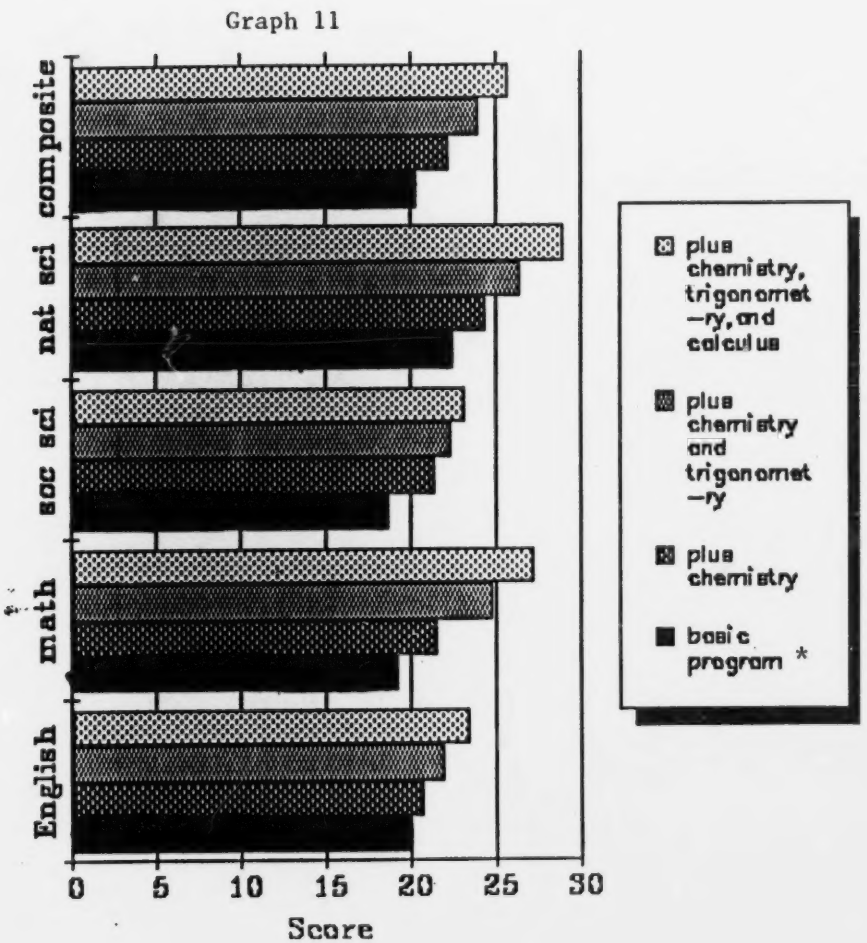


Table 11

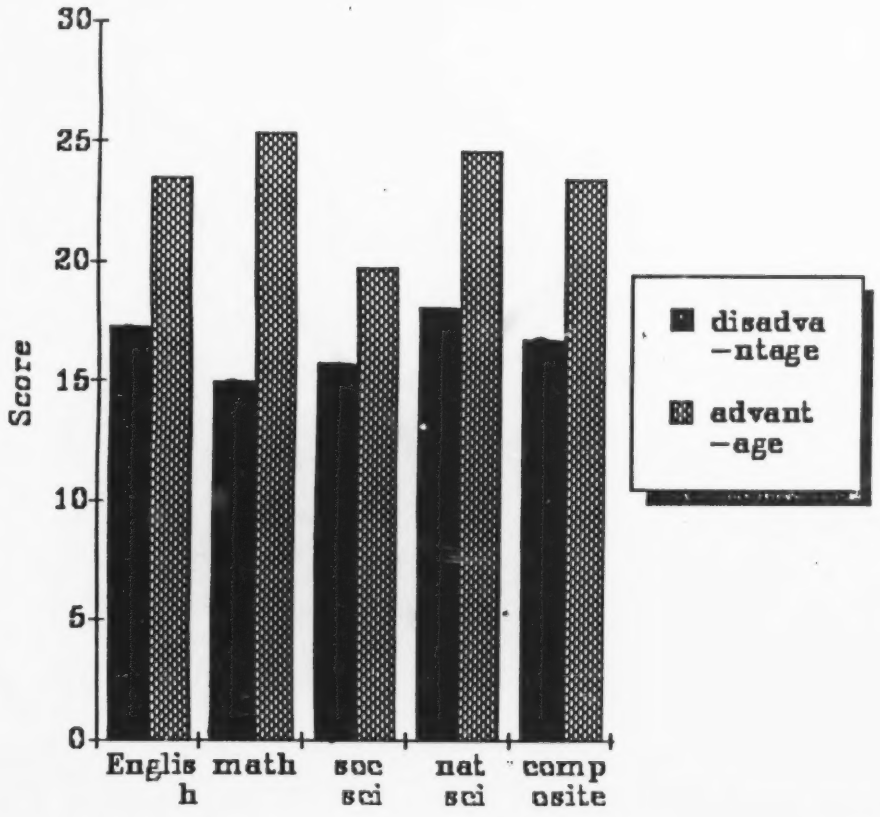
Courses taken	Eng-lish	Math-ematics	Social science	Natural science	comp-osite
Basic program	20.1	19.2	18.6	22.4	20.2
Plus chemistry	20.6	21.5	21.4	24.4	22.2
Plus chemistry and trigo-nometry	21.9	24.8	22.3	26.4	24.0
Plus chemistry, trigonometry, and calculus	23.4	27.1	23.1	28.9	25.7

*Basic Program: Algebra I, Algebra II, Geometry, Biology, English, Social Studies

Source. Data from American College Testing Program, Inc., Iowa City, Iowa. Compiled by George A. Chambers, Phyllis Peterson, and Joon Yul Choi, Division of Educational Administration, University of Iowa, Iowa City, IA 52242 for 1988 Annual NASSP Convention.

Graph 12-1

Caucasian ACT Scores under Advantaged and Disadvantaged Situations



	Disadvantage	Advantage
Graduating Class Size	200	600 or more
Family Inc.	$18,000	$36,000 or more
Science Taken	no physics no chemistry	physics or chemistry or both
Math Taken	no trigonometry no calculus	trigonometry, or calculus or both

Graph 12-2

Hispanic ACT Scores under Advantaged and Disadvantaged Situations

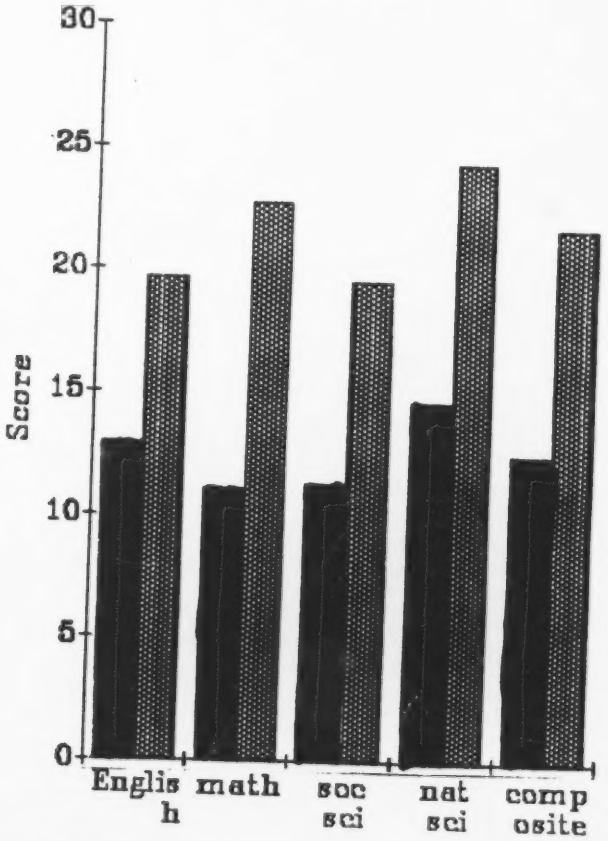


Table 12-1. Caucasian ACT Scores under Advantaged and Disadvantaged Situations*

	Disadvantaged Situation	Advantaged Situation	Score Difference
English	17.4	23.6	6.2
Mathematics	15.0	25.4	10.4
Social Studies	15.8	19.8	4.0
Natural Sciences	18.2	24.6	6.4
Composite	16.8	23.4	6.6

Table 12-2. Hispanic ACT Scores under Advantaged and Disadvantaged Situations*

	Disadvantaged Situation	Advantaged Situation	Score Difference
English	13.0	19.7	6.7
Mathematics	11.1	22.8	11.7
Social Studies	11.4	19.6	8.2
Natural Sciences	14.7	24.4	9.7
Composite	12.5	21.8	9.3

*	Disadvantage	Advantage
Graduating Class Size	200	600 or more
Family Income	$18,000	$36,000 or more
Science Taken	no physics no chemistry	physics or chemistry or both
Math Taken	no trigonometry no calculus	trigonometry, or calculus or both

Table 13. Comparison of ACT Scores for Hispanic and Caucasian Students Attending Public High Schools

Test	Group	N	Score Mean	Difference in Mean	Standard Deviation	T-Value	Probability
English	Hispanic	769	17.4	-1.7	6.0	-7.65	.00
	Caucasian		19.1				
Mathematics	Hispanic	769	16.0	-1.5	7.2	-5.43	.00
	Caucasian		17.5				
Social Studies	Hispanic	769	15.7	-1.9	8.7	-5.96	.00
	Caucasian		17.6				
Natural Sciences	Hispanic	769	19.4	-2.0	6.6	-8.27	.00
	Caucasian		21.4				
Composite	Hispanic	769	17.3	-1.7	5.7	-8.69	.00
	Caucasian		19.0				

Table 14. Comparison of ACT Scores for Hispanic and Caucasian Students Attending Catholic High School

Test	Group	N	Score Mean	Difference in Mean	Standard Deviation	T-Value	Probability
English	Hispanic	166	19.0	-0.4	6.2	-0.96	.34
	Caucasian		19.4				
Mathematics	Hispanic	166	16.7	-1.2	7.2	-2.13	.03
	Caucasian		17.9				
Social Studies	Hispanic	166	17.6	-0.9	8.5	-1.37	.17
	Caucasian		18.5				
Natural Sciences	Hispanic	166	20.5	-1.0	7.2	-1.65	.10
	Caucasian		21.5				
Composite	Hispanic	166	18.6	-0.8	5.7	-1.88	.06
	Caucasian		19.4				

Table 15. ACT Test Score Comparisons by Income Level of Students Attending Public and Catholic High Schools: For Hispanics and Caucasians

Family Income: $0-$11,999
Hispanic Students

Test	Group	N	Score Mean	Difference in Mean	Standard Deviation	T-Value	Probability
English	Public	81	16.1	-1.9	5.6	- .96	.36
	Catholic	10	18.0		6.0		
Mathematics	Public	81	12.5	-4.4	6.6	-1.98	.07
	Catholic	10	16.9		6.6		
Social Studies	Public	81	13.7	-2.4	7.3	- .89	.40
	Catholic	10	16.1		8.3		
Natural Sciences	Public	81	17.0	-2.3	5.5	- .91	.39
	Catholic	10	19.3		7.7		
Composite	Public	81	14.9	-2.9	5.3	-1.35	.21
	Catholic	10	17.8		6.5		

Caucasian Students

English	Public	82	17.3	.1	4.6	.04	.97
	Catholic	10	17.2		5.5		
Mathematics	Public	82	14.4	1.7	6.7	.71	.49
	Catholic	10	12.7		7.0		
Social Studies	Public	82	14.2	- .1	6.2	-.07	.95
	Catholic	10	14.3		5.5		
Natural Sciences	Public	82	18.6	1.0	5.2	.55	.59
	Catholic	10	17.6		5.4		
Composite	Public	82	16.3	.7	4.5	.40	.69
	Catholic	10	15.6		5.2		

Table 15 - continued

Family Income: $12,000-$17,999
Hispanic Students

Test	Group	N	Score Mean	Difference in Mean	Standard Deviation	T-Value	Probability
English	Public	66	16.2	-.5	5.1	-.38	.71
	Catholic	10	16.7		3.5		
Mathematics	Public	66	14.4	-.1	6.9	-.06	.96
	Catholic	10	14.5		6.3		
Social Studies	Public	66	14.1	2.5	6.8	1.10	.29
	Catholic	10	11.6		6.6		
Natural Sciences	Public	66	17.2	-.9	5.3	-.43	.68
	Catholic	10	18.1		6.1		
Composite	Public	66	15.5	.2	5.1	.14	.89
	Catholic	10	15.3		4.9		

Caucasian Students

English	Public	67	18.8	.7	4.9	.40	.70
	Catholic	10	18.1		5.4		
Mathematics	Public	67	15.7	1.5	7.4	.81	.43
	Catholic	10	14.2		5.2		
Social Studies	Public	67	16.2	-.9	6.7	-.60	.56
	Catholic	10	17.1		4.1		
Natural Sciences	Public	67	20.9	1.9	6.0	1.12	.28
	Catholic	10	19.0		4.9		
Composite	Public	67	18.1	.7	5.0	.53	.61
	Catholic	10	17.4		3.5		

Table 15 - continued

Family Income: $18,000-$23,999
Hispanic Students

Test	Group	N	Score Mean	Difference in Mean	Standard Deviation	T-Value	Probability
English	Public	77	17.0	-1.6	5.1	-1.07	.30
	Catholic	16	18.6		5.5		
Mathematics	Public	77	14.7	-.7	6.7	-.27	.79
	Catholic	16	15.4		10.4		
Social Studies	Public	77	13.9	-2.7	6.2	-1.45	.16
	Catholic	16	16.6		6.8		
Natural Sciences	Public	77	17.8	.0	5.2	-.03	.97
	Catholic	16	17.8		6.8		
Composite	Public	77	16.0	-1.3	4.7	-.74	.47
	Catholic	16	17.3		6.5		

Caucasian Students

English	Public	78	17.8	-1.7	5.0	-1.39	.18
	Catholic	16	19.5		4.3		
Mathematics	Public	78	15.5	-.1	6.5	-.05	.96
	Catholic	16	15.6		7.9		
Social Studies	Public	78	16.7	-1.6	6.8	-.78	.45
	Catholic	16	18.3		7.6		
Natural Sciences	Public	78	20.4	.3	5.9	.19	.85
	Catholic	16	20.1		6.3		
Composite	Public	78	17.8	-.6	5.1	-.42	.68
	Catholic	16	18.4		5.7		

Table 15 - continued

Family Income: $24,000-$35,999
Hispanic Students

Test	Group	N	Score Mean	Difference in Mean	Standard Deviation	T-Value	Probability
English	Public	279	17.1	-1.6	4.8	-2.64	.01
	Catholic	65	18.7		4.3		
Mathematics	Public	279	15.9	.4	6.8	.38	.70
	Catholic	65	15.5		8.0		
Social Studies	Public	279	15.3	-2.5	6.7	-2.31	.02
	Catholic	65	17.8		7.9		
Natural Sciences	Public	279	19.0	-1.7	5.6	-2.05	.04
	Catholic	65	20.7		6.2		
Composite	Public	279	16.9	-1.4	5.1	-1.69	.09
	Catholic	65	18.3		5.9		

Caucasian Students

English	Public	282	19.1	-.1	4.8	-.18	.85
	Catholic	66	19.2		4.9		
Mathematics	Public	282	17.5	-.6	7.2	-.59	.55
	Catholic	66	18.1		7.6		
Social Studies	Public	282	17.9	-.7	7.2	-.83	.41
	Catholic	66	18.6		6.4		
Natural Sciences	Public	282	21.4	.2	6.3	.19	.85
	Catholic	66	21.2		6.7		
Composite	Public	282	19.1	-.3	5.5	-.38	.71
	Catholic	66	19.4		5.6		

Table 15 - continued

Family Income: $36,000-$49,999
Hispanic Students

Test	Group	N	Score Mean	Difference in Mean	Standard Deviation	T-Value	Probability
English	Public	154	18.3	-1.7	5.0	-1.64	.11
	Catholic	32	20.0		5.5		
Mathematics	Public	154	17.0	-1.7	7.7	-1.15	.26
	Catholic	32	18.7		7.1		
Social Studies	Public	154	16.8	-3.3	7.0	-2.36	.02
	Catholic	32	20.1		7.3		
Natural Sciences	Public	154	21.2	-1.0	6.2	-0.85	.40
	Catholic	32	22.2		5.7		
Composite	Public	154	18.4	-2.0	5.6	-1.86	.07
	Catholic	32	20.4		5.5		

Caucasian Students

English	Public	153	19.8	-.2	4.8	-.16	.87
	Catholic	33	20.0		4.5		
Mathematics	Public	153	18.3	-1.1	7.6	-.83	.41
	Catholic	33	19.4		6.8		
Social Studies	Public	153	17.7	-1.1	6.9	-.82	.41
	Catholic	33	18.8		7.2		
Natural Sciences	Public	153	21.8	-1.3	5.6	-1.13	.26
	Catholic	33	23.1		6.1		
Composite	Public	153	19.5	-.9	5.3	-.83	.41
	Catholic	33	20.4		5.1		

Table 15 - continued

Family Income: $50,000 or more
Hispanic Students

Test	Group	N	Score Mean	Difference in Mean	Standard Deviation	T-Value	Probability
English	Public	112	18.9	-.8	4.9	-.66	.54
	Catholic	33	19.7		6.4		
Mathematics	Public	112	19.6	1.0	7.4	.69	.49
	Catholic	33	18.6		7.1		
Social Studies	Public	112	18.7	.9	6.9	.66	.51
	Catholic	33	17.8		6.9		
Natural Sciences	Public	112	22.2	1.3	6.0	1.00	.32
	Catholic	33	20.9		6.6		
Composite	Public	112	20.0	.6	5.5	.49	.63
	Catholic	33	19.4		6.0		

Caucasian Students

English	Public	113	20.2	-.3	4.7	-.50	.62
	Catholic	35	20.5		3.9		
Mathematics	Public	113	20.7	.5	7.0	.43	.67
	Catholic	35	20.2		5.9		
Social Studies	Public	113	20.2	.2	7.0	.20	.85
	Catholic	35	20.0		7.3		
Natural Sciences	Public	113	23.8	.5	6.3	.49	.63
	Catholic	35	23.3		5.3		
Composite	Public	113	21.4	.3	5.4	.29	.78
	Catholic	35	21.1		4.6		

Table 16. Relationships of Thirteen Study Variables with Hispanic Student Scores on the ACT (Stepwise Multiple Linear Regression)

English

Step	Variable	Multiple R	R Square	R Square Change
1	Chemistry	.3401	.1157	.1157
2	Trigonometry	.3990	.1592	.0435
3	Geometry	.4289	.1840	.0248
4	Algebra II	.4384	.1922	.0082
.				
13	Physics	.4769	.2274	.0008

Mathematics

Step	Variable	Multiple R	R Square	R Square Change
1	Trigonometry	.5444	.2964	.2964
2	Chemistry	.6028	.3634	.0670
3	Algebra II	.6299	.3968	.0334
4	Calculus	.6499	.4224	.0256
.				
13	Algebra I	.6768	.4581	.0000

Social Studies

Step	Variable	Multiple R	R Square	R Square Change
1	Chemistry	.3881	.1506	.1506
2	Trigonometry	.4489	.2015	.0509
3	Geometry	.4625	.2139	.0124
4	Family Income	.4736	.2243	.0104
.				
13	Algebra I	.5007	.2507	.0000

Natural Sciences

Step	Variable	Multiple R	R Square	R Square Change
1	Chemistry	.4458	.1988	.1988
2	Trigonometry	.5117	.2619	.0631
3	Gender	.5441	.2960	.0341
4	Family Income	.5595	.3131	.0171
.				
13	Biology	.5918	.3503	.0000

Composite

Step	Variable	Multiple R	R Square	R Square Change
1	Trigonometry	.4934	.2434	.2434
2	Chemistry	.5746	.3302	.0867
3	Algebra II	.5923	.3508	.0206
4	Calculus	.6091	.3710	.0201
.				
13	Biology	.6434	.4140	.0003

Table 17. Relationships of Thirteen Study Variables with Caucasian Student Scores on the ACT (Stepwise Multiple Linear Regression)

English

Step	Variable	Multiple R	R Square	R Square Change
1	Chemistry	.3621	.1311	.1311
2	Trigonometry	.4244	.1801	.0490
3	Geometry	.4400	.1936	.0135
4	Calculus	.4546	.2066	.0130
.				
13	Grade Size	.4838	.2341	.0000

Mathematics

Step	Variable	Multiple R	R Square	R Square Change
1	Trigonometry	.5613	.3151	.3151
2	Chemistry	.6376	.4065	.0915
3	Physics	.6585	.4337	.0271
4	Algebra II	.6814	.4643	.0306
.				
13	Siblings	.7099	.5040	.0003

Social Studies

Step	Variable	Multiple R	R Square	R Square Change
1	Trigonometry	.3408	.1161	.1161
2	Chemistry	.3993	.1594	.0433
3	Physics	.4239	.1797	.0203
4	Family Income	.4411	.1946	.0149
.				
13	Grade Size	.4664	.2175	.0000

Natural Sciences

Step	Variable	Multiple R	R Square	R Square Change
1	Trigonometry	.4309	.1857	.1857
2	Chemistry	.5014	.2514	.0657
3	Physics	.5344	.2855	.0341
4	Gender	.5508	.3033	.0178
.				
13	Siblings	.5708	.3258	.0000

Composite

Step	Variable	Multiple R	R Square	R Square Change
1	Trigonometry	.4973	.2473	.2473
2	Chemistry	.5771	.3330	.0857
3	Physics	.6002	.3602	.0272
4	Geometry	.6129	.3757	.0154
.				
13	Algebra I	.6394	.4088	.0000

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